



TEST REPORT

Application No: ZR/2020/A0015
Applicant: HMD global Oy
Address of Applicant: Bertel Jungin aukio 9, 02600 Espoo, Finland
Manufacturer: HMD global Oy
Address of Manufacturer: Bertel Jungin aukio 9, 02600 Espoo, Finland
EUT Description: Smart Phone
Model No.: TA-1322
Trade Mark: NOKIA
FCC ID: 2AJOTTA-1322
Standard(s) : 47 CFR Part 15, Subpart B
Date of Receipt: 2020/10/19
Date of Test: 2020/10/23 to 2020/12/10
Date of Issue: 2020/12/11

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Derek Yang

Wireless Laboratory Manager

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**SGS-CSTC STANDARDS TECHNICAL SERVICES
(XI 'AN) CO., LTD.**

Report No.: ZR/2020/A001505
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<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		2020/12/11		Original

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Test Summary

Emission Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at Mains Terminals (150kHz-30MHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass
Radiated Emissions (30MHz-1GHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass
Radiated Emissions (above 1GHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass

Internal Source	Upper Frequency
Below 1.705MHz	30MHz
1.705MHz to 108MHz	1GHz
108MHz to 500MHz	2GHz
500MHz to 1GHz	5GHz
Above 1GHz	5th harmonic of the highest frequency or 40GHz, whichever is lower

Checked By

David Chen

David Chen
Reviewer

Test By

Daniel Wang

Daniel Wang
Project Engineer

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1 General Information

Product Name:	Smart Phone		
Model No.(EUT):	TA-1322		
Trade Mark:	NOKIA		
Hardware Version:	V1.0		
Software Version:	00WW_0_070		
Frequency Bands:	Band	Tx (MHz)	Rx (MHz)
	GSM850	824~849	869~894
	GSM1900	1850~1910	1930~1990
	WCDMA Band V	824~849	869~894
	LTE Band 5	824~849	869~894
	LTE Band 7	2500~2570	2620~2690
	LTE Band 38	2570~2620	2570~2620
	LTE Band 41	2535~2655	2535~2655
	Wi-Fi 2.4G	2412~2462	2412~2462
	Bluetooth	2402~2480	2402~2480

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Accessories:

Battery			
Battery1	Ningbo Veken Battery Co., Ltd.	V730	3.85V 3900mAh li-Polymer battery
Battery2	Zhaoqing Fenghua Lithium Battery Co.,LTD.	V730	3.85V 3900mAh li-Polymer battery
USB Cable			
USB Cable1	GUANGDONG WEIWANGDA ELECTRONICS CO., LTD	DA-B0609-N	Micro_5pin data cable/shielding aluminum foil/1m/AWG24 black
USB Cable2	SUNTOPS ELECTRONICS CO.,LTD	336189	Micro_5pin data cable/shielding aluminum foil/1m/AWG24 black
Adapter			
Adapter1 (EU)	Chongqing Lianmao Electronic Co., Ltd.	TN-050120E8	5V1.0A/100-240V/black
Adapter2 (US)	Chongqing Lianmao Electronic Co., Ltd.	TN-050120U8	5V1.0A/100-240V/black
Adapter3 (AU)	Chongqing Lianmao Electronic Co., Ltd.	TN-050120AU8	5V1.0A/100-240V/black
Adapter4 (UK)	Guangdong Beicom Electronics Co.,Ltd.	TN-050120B8	5V1.0A/100-240V/black
Adapter5 (US)	Guangdong Beicom Electronics Co.,Ltd.	TN-050120U8	5V1.0A/100-240V/black
Adapter6 (EU)	Guangdong Beicom Electronics Co.,Ltd.	TN-050120E8	5V1.0A/100-240V/black
Earphone			
Earphone1	GuangDong AllWin Technology Co.,Ltd	XL-5178	3.5 round wire earbud style/with microphone/black/1.5m/straight
Earphone2	Huizhou New Leader Industry Co., Ltd.	NLD-305M-06SF	3.5 round wire earbud style/with microphone/black/1.5m/straight

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1.1 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	T430u	REF. No.SEA1800
Mouse	Lenovo	M-U0025-O	REF. No.:SEA2400
Router	NETGEAR	DGN2200	REF. No.SEA2200

1.2 Test Location

All tests were performed at:

Company:	SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.
Address:	Single floor D, building 1, Kanghong orange square science and technology park, No.137 keyuan 3rd road, fengdong new town, Xi 'an city, Shaanxi China
Post code:	710000

No tests were sub-contracted.

1.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA (Certificate No. 4854.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.

is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4854.01.

Test Site No.:	SGS Xian Site No.		FCC Designation No.
	CO01-XA	03CH01-XA	CN1271

1.4 Deviation from Standards

None

1.5 Abnormalities from Standard Conditions

None

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2 Emission Test Results

2.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)

Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Frequency Range:	150kHz to 30MHz
Limit:	
0.15M-0.5MHz	66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average
0.5M-5MHz	56dB(μV) quasi-peak, 46dB(μV) average
5M-30MHz	60dB(μV) quasi-peak, 50dB(μV) average
Detector:	Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

2.1.1 E.U.T. Operation

Operating Environment:	
Temperature:	18.9 °C
Humidity:	55.1 % RH
Atmospheric Pressure:	1000 mbar
Pretest these modes to find the worst case:	a: Transfer data between the EUT and the PC+USB cable1 b: Transfer data between the EUT and the PC+USB cable2 c: GSM 850 Idle+BT+WLAN +playing MP4 (SD card) +earphone1+battery1+Cable(worst)+adapter1 d: WCDMA Band V Idle+BT+WLAN +playing MP4 (SD card) +earphone2+battery2+ Cable(worst)+adapter2 e: LTE Band 5 Idle+BT+WLAN +camera (Front) +earphone(worst)+battery(worst)+ Cable(worst)+adapter3
The worst case for final test:	c: GSM 850 Idle+BT+WLAN +playing MP4 (SD card) +earphone1+battery1+Cable(worst)+adapter1

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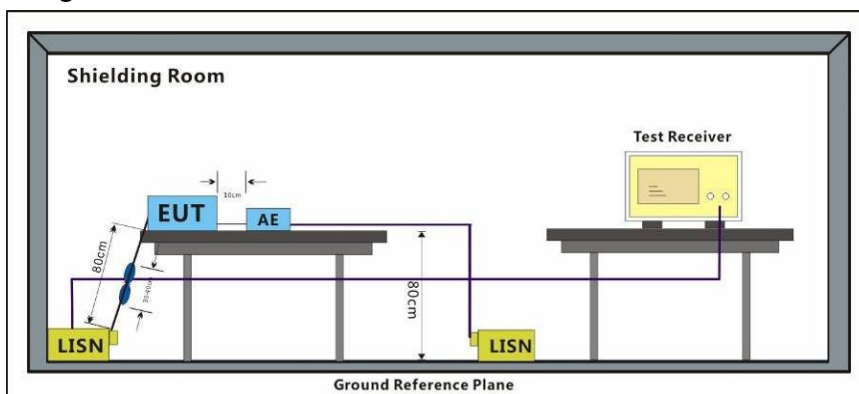
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2.1.2 Test Setup Diagram



2.1.3 Measurement Data

An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

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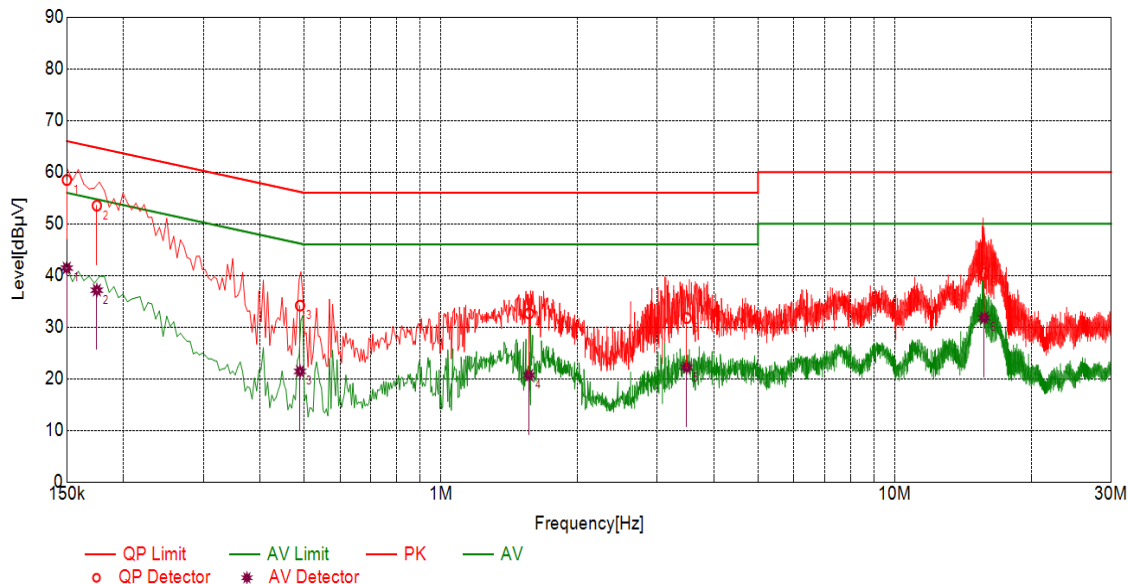
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Firstly Supply:

Mode:c; Line:Live Line



Test Graph

Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]
1	0.1500	10.10	58.47	66.00	7.53	41.43	56.00	14.57
2	0.1747	10.10	53.51	64.74	11.23	37.14	54.74	17.60
3	0.4897	10.10	34.16	56.17	22.01	21.42	46.17	24.75
4	1.5648	10.10	32.64	56.00	23.36	20.67	46.00	25.33
5	3.4799	10.10	31.76	56.00	24.24	22.17	46.00	23.83
6	15.7416	10.11	40.45	60.00	19.55	31.81	50.00	18.19

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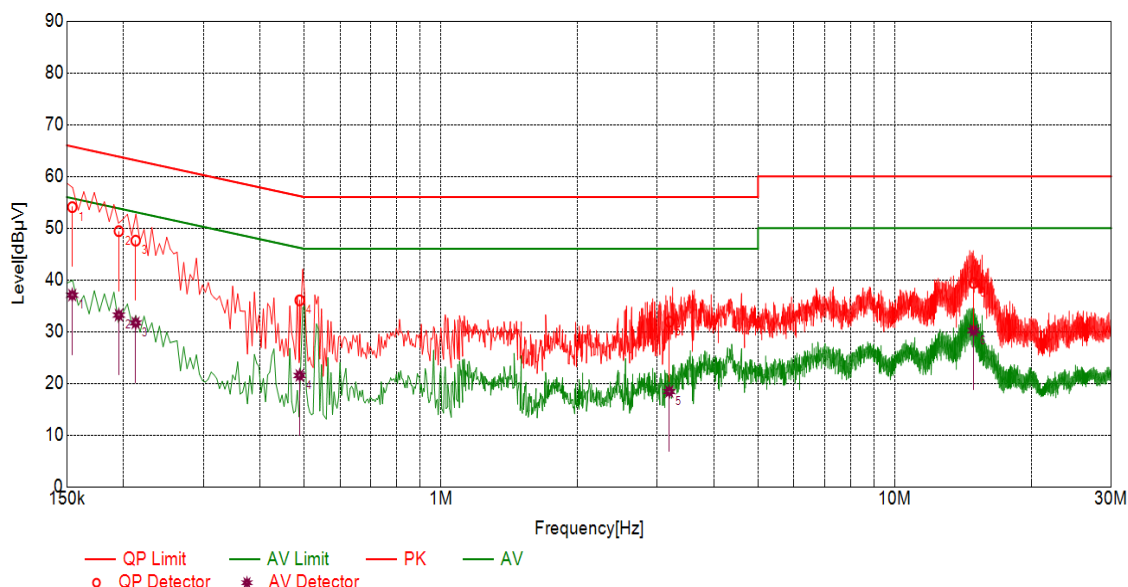
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Mode:c; Line:Neutral Line



Test Graph

Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]
1	0.1542	10.10	54.06	65.77	11.71	37.05	55.77	18.72
2	0.1953	10.10	49.42	63.81	14.39	33.19	53.81	20.62
3	0.2127	10.10	47.58	63.10	15.52	31.69	53.10	21.41
4	0.4887	10.10	36.05	56.19	20.14	21.52	46.19	24.67
5	3.1870	10.10	31.91	56.00	24.09	18.41	46.00	27.59
6	14.9232	10.11	39.40	60.00	20.60	30.22	50.00	19.78

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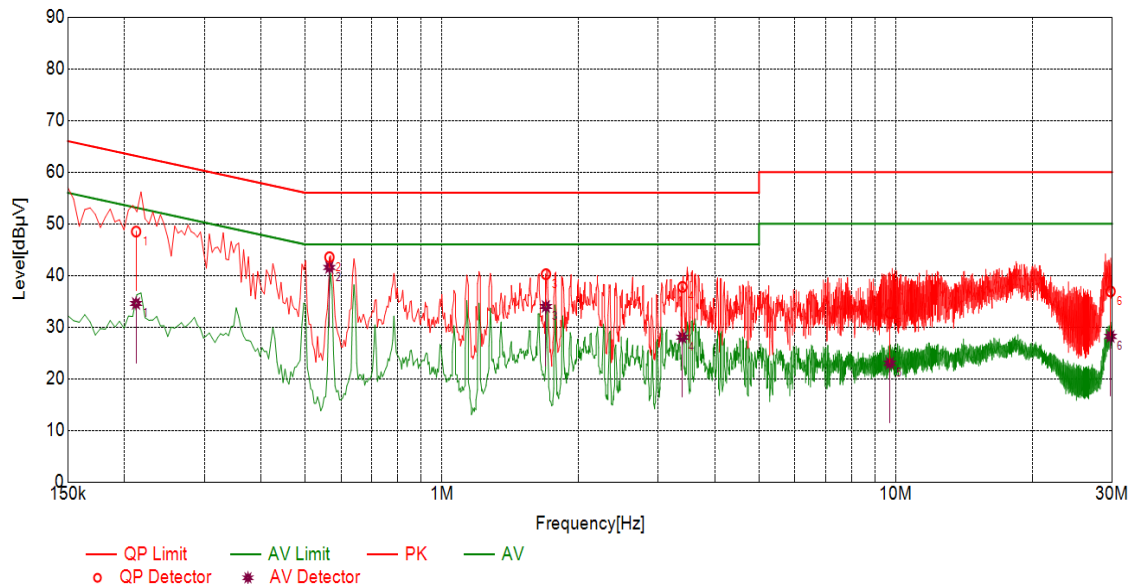
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Secondly Supply:

Mode:c; Line:Live Line

**Test Graph****Final Data List**

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Type
1	0.2121	10.10	48.48	63.12	14.64	34.57	53.12	18.55	L
2	0.5655	10.10	43.52	56.00	12.48	41.54	46.00	4.46	L
3	1.6961	10.10	40.24	56.00	15.76	33.99	46.00	12.01	L
4	3.3892	10.10	37.78	56.00	18.22	28.04	46.00	17.96	L
5	9.7092	10.10	32.74	60.00	27.26	23.01	50.00	26.99	L
6	29.7383	10.11	36.91	60.00	23.09	28.20	50.00	21.80	L

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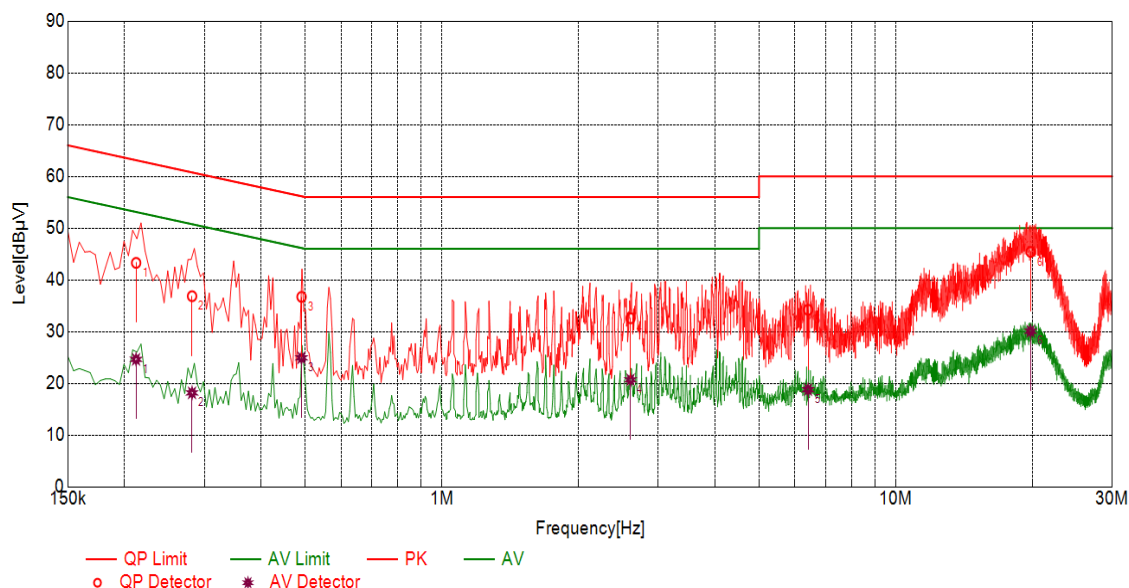
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Mode:c; Line:Neutral Line



Test Graph

Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Type
1	0.2121	10.10	43.29	63.12	19.83	24.63	53.12	28.49	N
2	0.2817	10.10	36.85	60.77	23.92	18.16	50.77	32.61	N
3	0.4909	10.10	36.72	56.15	19.43	24.93	46.15	21.22	N
4	2.6051	10.10	32.58	56.00	23.42	20.68	46.00	25.32	N
5	6.4129	10.10	34.22	60.00	25.78	18.78	50.00	31.22	N
6	19.8262	10.11	45.41	60.00	14.59	30.07	50.00	19.93	N

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2.2 Radiated Emissions (30MHz-1GHz)

Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Frequency Range:	30MHz to 1GHz
Measurement Distance:	3m
Limit:	
30MHz -88MHz	40.0(dBμV/m) quasi-peak
88MHz-216MHz	43.5(dBμV/m) quasi-peak
216MHz-960MHz	46.0(dBμV/m) quasi-peak
960MHz-1000MHz	54.0(dBμV/m) quasi-peak
Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30M to1000MHz

2.1.4 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 66.5 % RH Atmospheric Pressure: 1010 mbar

Pretest these modes to find the worst case:

- a: Transfer data between the EUT and the PC+USB cable1
- b: Transfer data between the EUT and the PC+USB cable2
- c: GSM 850 Idle+BT+WLAN +playing MP4 (SD card)
+earphone1+battery1+Cable(worst)+adapter1
- d: WCDMA Band V Idle+BT+WLAN +playing MP4 (SD card)
+earphone2+battery2+ Cable(worst)+adapter2
- e: LTE Band 5 Idle+BT+WLAN +camera (Front)
+earphone(worst)+battery(worst)+ Cable(worst)+adapter3

The worst case for final test:

- a: GSM 850 Idle+BT+WLAN +playing MP4 (SD card)
+earphone1+battery1+Cable(worst)+adapter1

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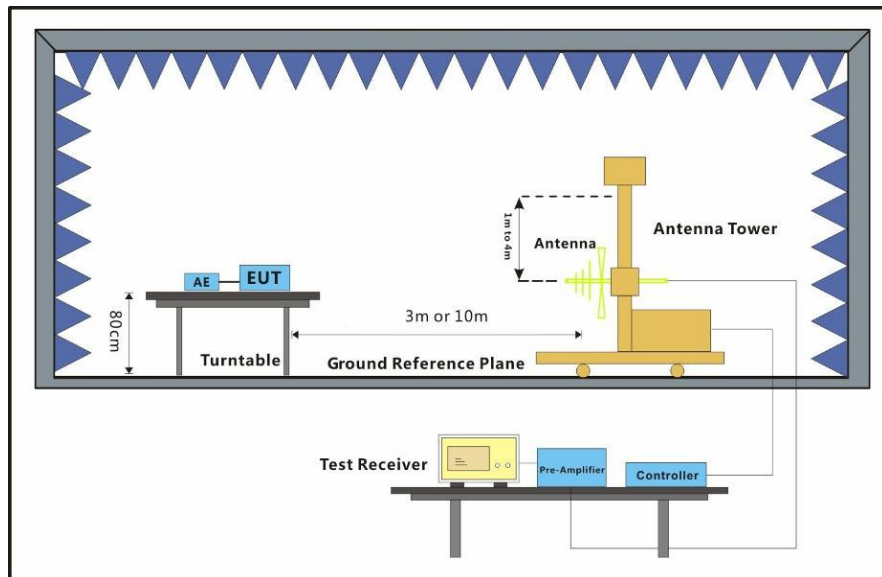
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2.1.5 Test Setup Diagram



2.1.6 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

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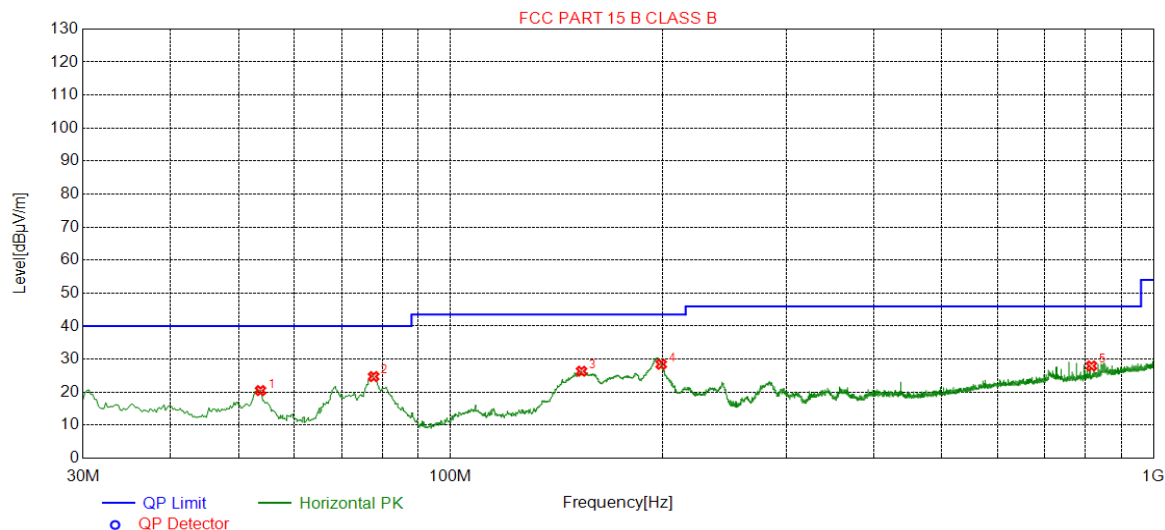
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邮编 710086 sgs.china@sgs.com

Firstly Supply:

Mode:a; Polarization:Horizontal

**Suspected List**

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	53.6727	20.49	40.00	19.51	200	228	Horizontal
2	77.7335	24.73	40.00	15.27	200	105	Horizontal
3	153.6027	26.36	43.50	17.14	200	66	Horizontal
4	199.3959	28.45	43.50	15.05	100	224	Horizontal
5	816.0512	27.95	46.00	18.05	100	30	Horizontal

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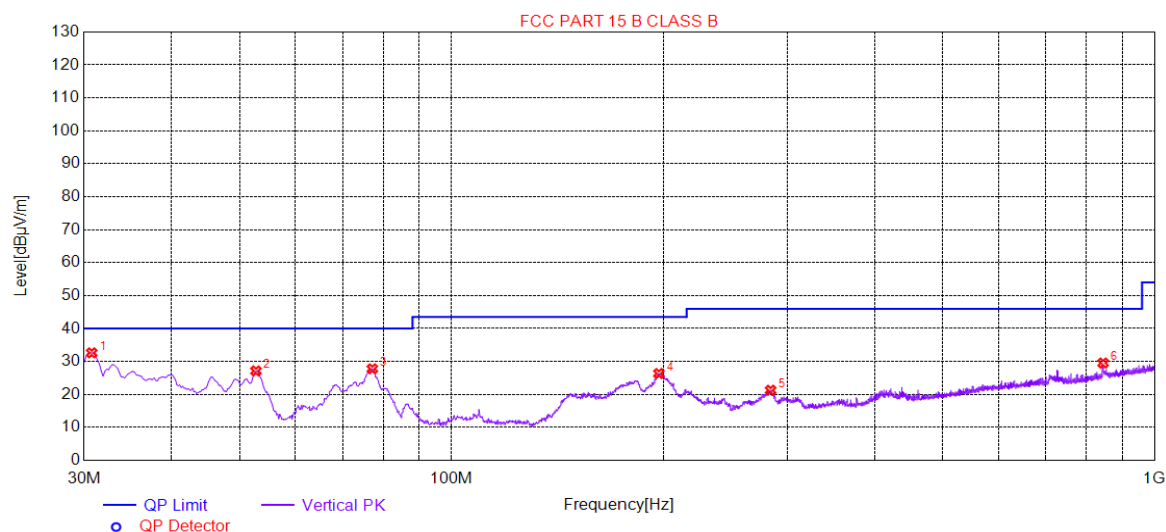
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Mode:a; Polarization:Vertical

**Suspected List**

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.7762	32.64	40.00	7.36	100	0	Vertical
2	52.7025	27.15	40.00	12.85	100	332	Vertical
3	77.1514	27.80	40.00	12.20	100	255	Vertical
4	197.2615	26.37	43.50	17.13	100	240	Vertical
5	284.3849	21.29	46.00	24.71	200	310	Vertical
6	845.1570	29.55	46.00	16.45	100	269	Vertical

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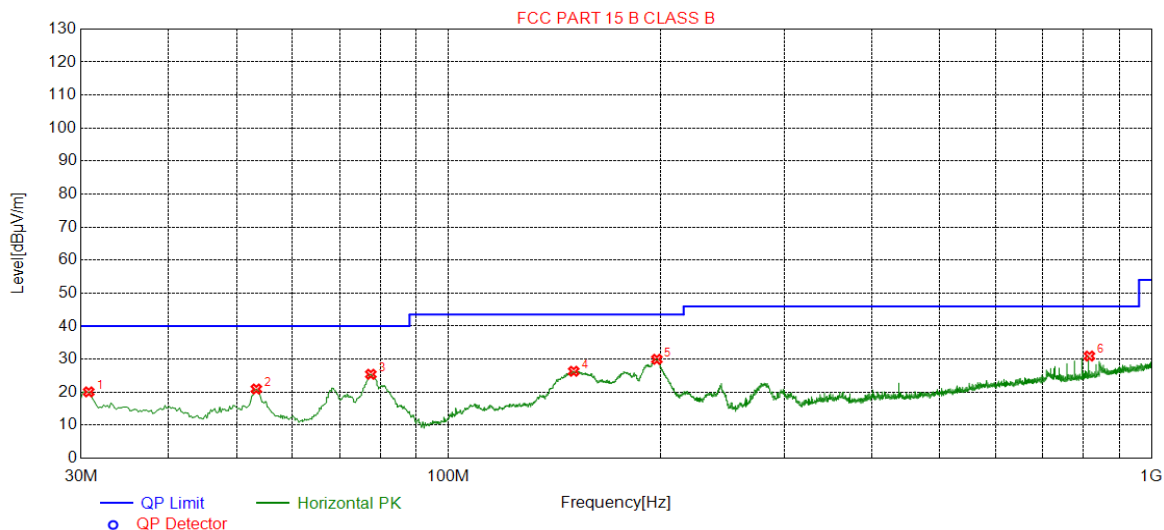
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Secondly Supply:

Mode:a; Polarization:Horizontal



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.7762	20.10	40.00	19.90	200	265	Horizontal
2	53.2847	20.97	40.00	19.03	200	238	Horizontal
3	77.5395	25.43	40.00	14.57	200	107	Horizontal
4	150.6921	26.34	43.50	17.16	200	63	Horizontal
5	197.8436	29.97	43.50	13.53	100	203	Horizontal
6	816.0512	30.95	46.00	15.05	100	22	Horizontal

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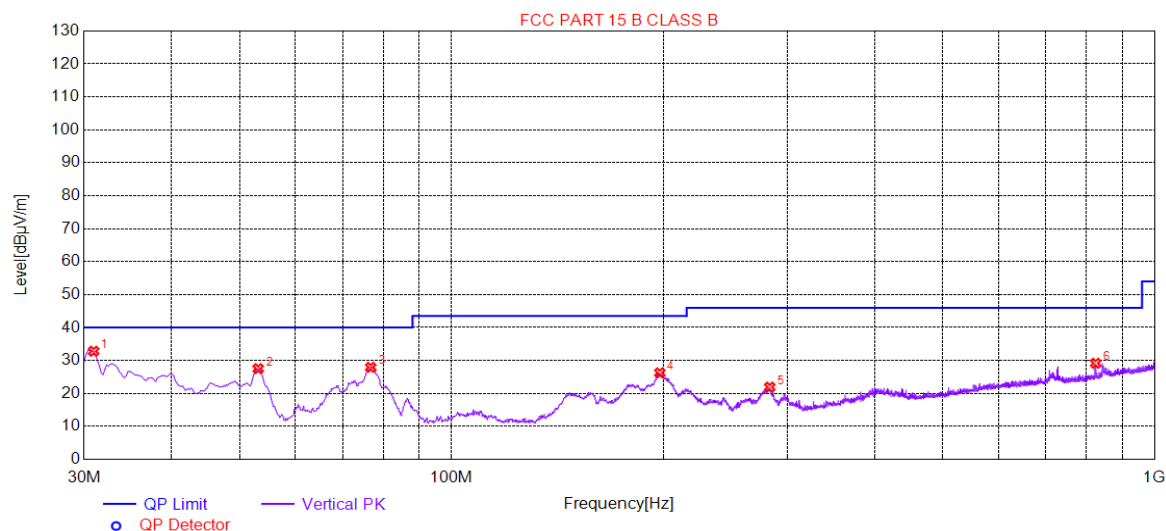
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Mode:a; Polarization:Vertical



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.9702	32.82	40.00	7.18	100	14	Vertical
2	53.0906	27.54	40.00	12.46	100	0	Vertical
3	76.7634	27.94	40.00	12.06	100	236	Vertical
4	197.8436	26.26	43.50	17.24	100	34	Vertical
5	283.6087	21.94	46.00	24.06	200	224	Vertical
6	824.7830	29.18	46.00	16.82	100	8	Vertical

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2.3 Radiated Emissions (above 1GHz)

Test Requirement: 47 CFR Part 15, Subpart B
Test Method: ANSI C63.4:2014
Frequency Range: Above 1GHz
Measurement Distance: 3m
Limit:
Above 1GHz 74(dBμV/m) peak, 54(dBμV/m) average
Detector: Peak for pre-scan (1000kHz resolution bandwidth) 1000M to 18000MHz

2.1.7 E.U.T. Operation

Operating Environment:

Temperature: 21.7 °C Humidity: 56.4 % RH Atmospheric Pressure: 1010 mbar

Pretest these modes to find the worst case:

- a: Transfer data between the EUT and the PC+USB cable1
- b: Transfer data between the EUT and the PC+USB cable2
- c: GSM 850 Idle+BT+WLAN +playing MP4 (SD card)
+earphone1+battery1+Cable(worst)+adapter1
- d: WCDMA Band V Idle+BT+WLAN +playing MP4 (SD card)
+earphone2+battery2+ Cable(worst)+adapter2
- e: LTE Band 5 Idle+BT+WLAN +camera (Front)
+earphone(worst)+battery(worst)+ Cable(worst)+adapter3

The worst case for final test: c: GSM 850 Idle+BT+WLAN +playing MP4 (SD card)
+earphone1+battery1+Cable(worst)+adapter1

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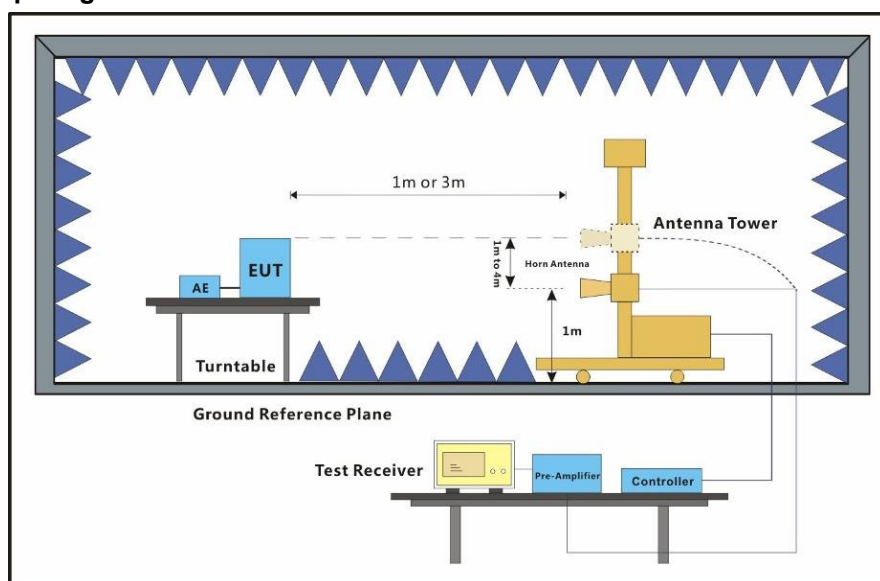
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2.1.8 Test Setup Diagram



2.1.9 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

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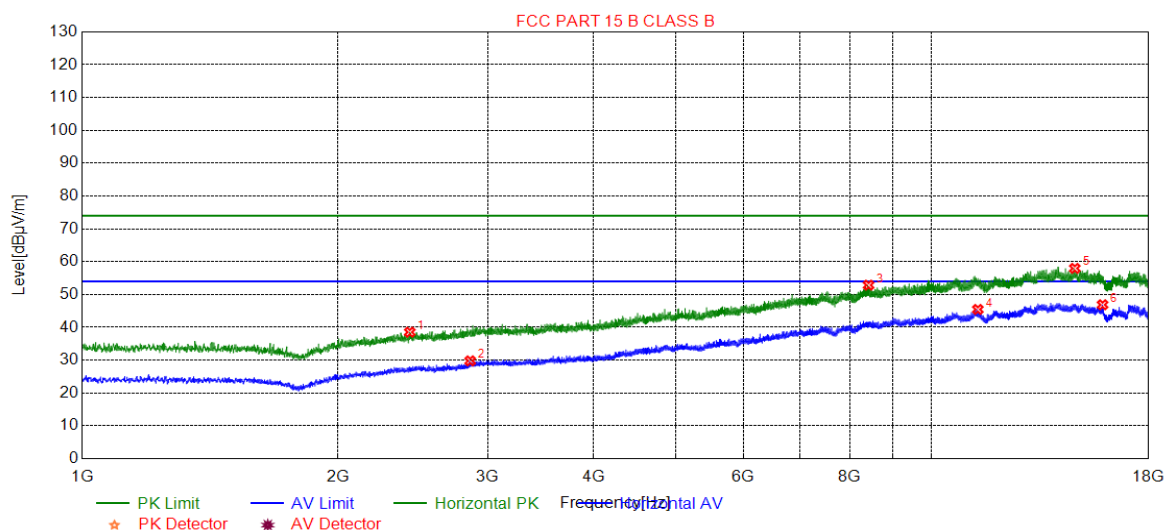
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邮编 710086 sgs.china@sgs.com

Firstly Supply:

Mode:c; Polarization:Horizontal

**Suspected List**

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2429.771	38.55	-26.23	74.00	35.45	100	Horizontal
2	2861.593	29.80	-24.21	54.00	24.20	100	Horizontal
3	8424.271	52.87	-7.59	74.00	21.13	100	Horizontal
4	11326.31	45.47	-3.04	54.00	8.53	100	Horizontal
5	14731.58	57.98	0.83	74.00	16.02	100	Horizontal
6	15882.54	46.89	-0.47	54.00	7.11	100	Horizontal

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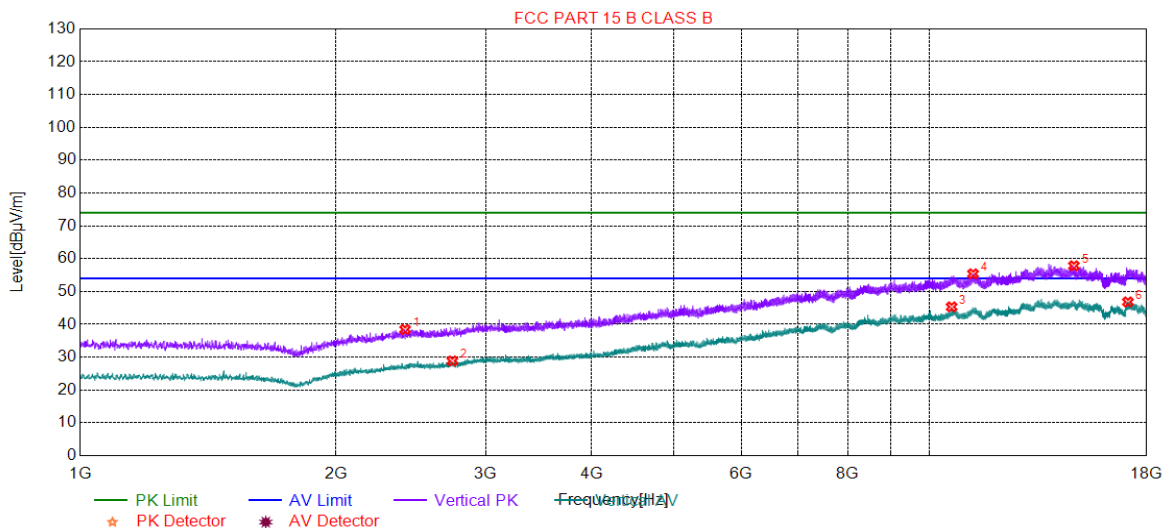
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Mode:c; Polarization:Vertical



Suspected List

Suspected List							
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity
1	2411.920	38.44	-26.33	74.00	35.56	100	Vertical
2	2741.737	28.86	-24.93	54.00	25.14	100	Vertical
3	10608.03	45.33	-3.56	54.00	8.67	200	Vertical
4	11242.16	55.41	-3.19	74.00	18.59	200	Vertical
5	14774.93	57.84	0.89	74.00	16.16	100	Vertical
6	17104.90	46.84	-2.72	54.00	7.16	200	Vertical

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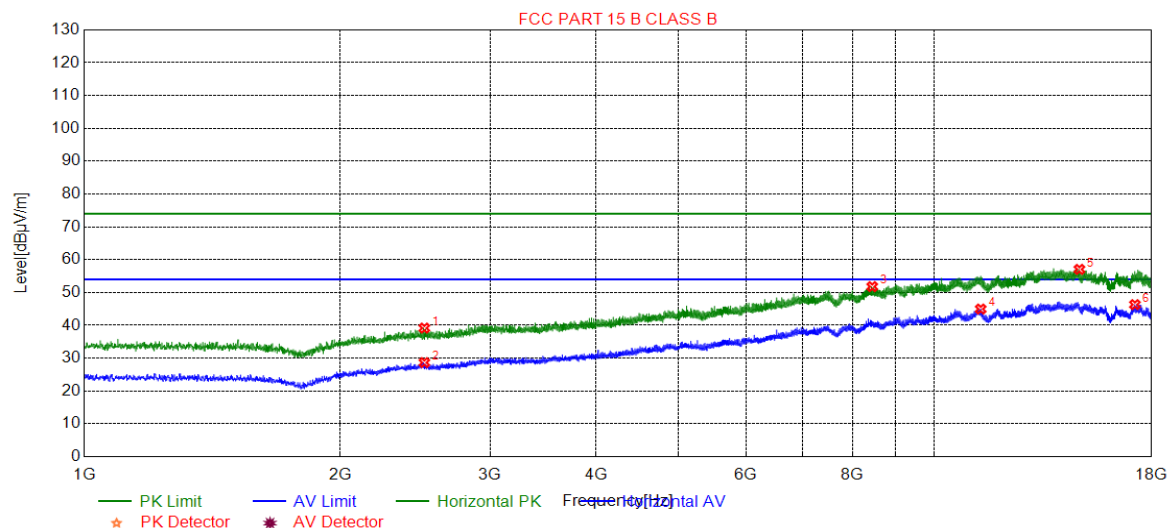
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Secondly Supply:

Mode:c; Polarization:Horizontal

**Suspected List**

Suspected List					
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2511.3756	39.18	74.00	34.82	Horizontal
2	2511.3756	28.67	54.00	25.33	Horizontal
3	8444.6722	51.81	74.00	22.19	Horizontal
4	11328.8664	44.98	54.00	9.02	Horizontal
5	14799.5900	57.07	74.00	16.93	Horizontal
6	17201.8101	46.33	54.00	7.67	Horizontal

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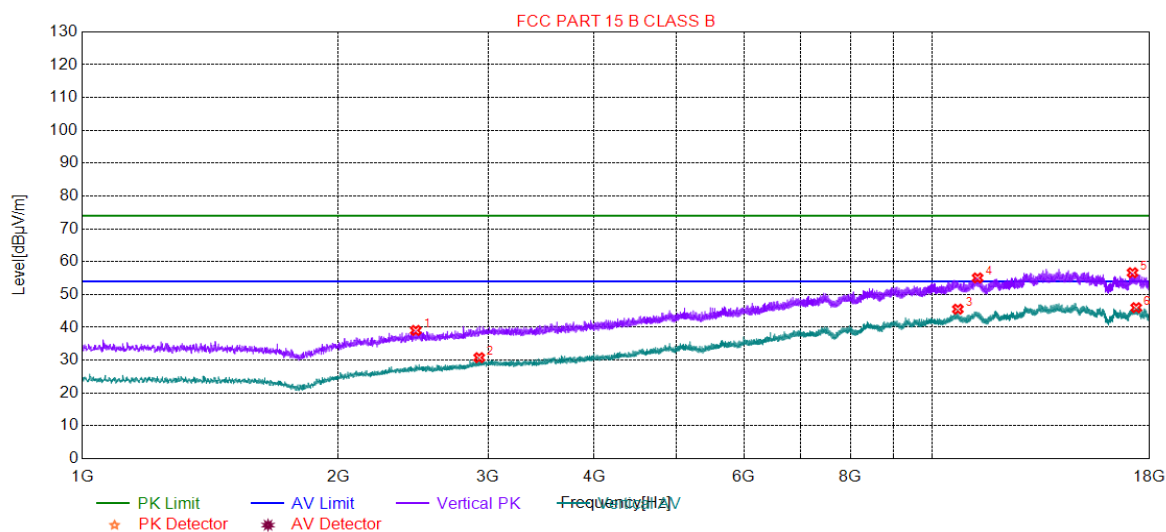
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Mode:c; Polarization:Vertical



Suspected List

Suspected List					
NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	2467.1734	39.07	74.00	34.93	Vertical
2	2929.5965	30.78	54.00	23.22	Vertical
3	10706.6353	45.55	54.00	8.45	Vertical
4	11294.0147	55.06	74.00	18.94	Vertical
5	17183.1092	56.65	74.00	17.35	Vertical
6	17354.8177	46.00	54.00	8.00	Vertical

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3 Equipment List

Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
Semi-Anechoic Chamber	Brilliant-emc	966	XAW03-35-01	NCR	NCR
MXA signal analyzer	Keysight	N9020A	XAW01-06-01	2020/4/2	2021/4/2
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2020/4/2	2021/4/2
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2020/9/7	2021/9/6
Receiving antenna	Rosenberger	VULB 9163	XAW01-09-01	2019/10/13	2021/10/12
Receiving antenna	Rosenberger	BBHA 9120D	XAW01-09-02	2019/10/13	2021/10/12
Receiving antenna	Rosenberger	BBHA 9170	XAW01-09-03	2019/10/13	2021/10/12
Directional antenna rack controller	Max-Full	MF-7802BS	XAW03-03-01	NCR	NCR
High-speed antenna rack controller	Max-Full	MF-7802	XAW03-04-01	NCR	NCR
Filter bank	Tonscend	JS0806-F	XAW03-05-01	NCR	NCR
Filter bank	Tonscend	JS0806s	XAW03-05-02	NCR	NCR
Amplifier	Tonscend	TAP00903040	XAW01-41-01	2020/11/17	2021/11/16
				2019/11/18	2020/11/17
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2020/11/17	2021/11/16
				2019/11/18	2020/11/17
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2020/12/3	2021/12/3
				2019/12/3	2020/12/3
Amplifier	Brilliant-emc	YX28980930	XAW01-41-06	2020/11/17	2021/11/16
				2019/11/18	2020/11/17
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-19-02	2020/09/16	2021/9/15

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4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction Emission	$\pm 3.4\text{dB}$ (150kHz to 30MHz)
2	Radiated Emission	$\pm 4.8\text{dB}$ (30MHz-1GHz)
		$\pm 5.2\text{dB}$ (1GHz-6GHz)
		$\pm 5.5\text{dB}$ (6GHz-18GHz)
		$\pm 5.02\text{dB}$ (18GHz-40GHz)

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5 Photographs

5.1 Test Setup

Refer to Appendix A - Photographs of Set-Up for ZR/2020/A0015.

5.2 EUT Constructional Details (EUT Photos)

Refer to Photographs of EUT Constructional Details

- End of the Report -

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